

CLAIMS

1. A medical connector system comprising:

5 a male type connector including a tube connecting portion at a rear end portion of the male type connector;

a protective cap having a substantially cylindrical shape with a closed end and being capable of connecting and disconnecting with/from a front end side of the male type connector;

10 an inner cap including an annular portion that supports a disinfectant-impregnated member in the annular portion, the inner cap being retained inside the protective cap in an initial state; and

15 a female type connector having a double-cylinder structure in which an inner cylinder is fixed at one end portion of an outer cylinder, the inner cylinder including an internal end portion located inside the outer cylinder and an external end portion that is exposed outside the outer cylinder and is capable of connecting with a tube,

wherein the inner cap includes a plurality of engaging legs extending from the annular portion in a direction along an axis of the annular portion,

20 an engaging convexity is formed on an outer surface of a front end portion of each of the engaging legs,

the front end portion of the male type connector has a cylindrical shape and includes engaging concavities so as to allow the engaging convexities at the engaging legs to engage with the engaging concavities from inside,

25 an inner cap retaining portion is formed on an inner wall surface of the protective cap, and

30 a force exerted by the engagement between the engaging convexity of the inner cap and the engaging concavity of the male type connector is larger than a force exerted by the inner cap retaining portion to retain the inner cap,

when the protective cap with the inner cap retained in the protective cap is fitted with the male type connector, the engaging convexities at the engaging legs engage with the engaging concavities of the male type connector,

5 when the protective cap is removed from the male type connector, the inner cap is retained at the front end of the male type connector and is detached from the protective cap, and

 when the male type connector with the inner cap retained in the male type connector is connected with the female type connector, the internal end
10 portion of the inner cylinder penetrates through the disinfectant-impregnated member, so that a channel is opened.

2. The medical connector system according to claim 1,

 wherein the female type connector includes an inner cap retaining
15 portion, and

 when the connection between the male type connector and the female type connector is released, the inner cap is retained inside the female type connector by the inner cap retaining portion and is detached from the front end of the male type connector.

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3. The medical connector system according to claim 1,

 wherein the male type connector includes a septum member at the front end portion of the male type connector for shielding an inner cavity, and

 when the male type connector with the inner cap retained at the front
25 end of the male type connector is connected with the female type connector, the internal end portion of the inner cylinder penetrates through the disinfectant-impregnated member in the inner cap and the septum member of the male type connector, so that a channel is opened.

30 4. The medical connector system according to claim 2,

wherein on an outer surface of the male type connector, a circumferential step portion extending in a circumferential direction is formed so that a diameter at the front end side of the male type connector is smaller than that at a base end side, and a guide groove is formed so as to extend from the circumferential step portion toward the base end, the guide groove including an inclined portion that is inclined with respect to an axis of the male type connector,

on the inner wall surface close to an opening end portion of the protective cap, a guide protrusion is formed, and

when the male type connector is inserted from an opening of the protective cap with the guide protrusion of the protective cap facing the guide groove of the male type connector, and then the protective cap and the male type connector are rotated while being urged axially toward each other, the guide protrusion slides along the guide groove, so that the male type connector is pulled into an inside of the protective cap by a driving force resulting from a screw action by the inclined portion of the guide groove, and the engaging convexities of the inner cap engage with the engaging concavities of the male type connector.

5. The medical connector system according to claim 4,

wherein the male type connector includes a blocking protrusion on an inner circumferential surface of the front end portion of the male type connector, which is capable of contacting with a side face portion of the engaging leg of the inner cap when the inner cap is fitted with the male type connector,

the outer cylinder of the female type connector includes a guide protrusion formed on an inner wall surface close to an open end portion of the outer cylinder and a guide step portion including an inclined portion that is inclined with respect to an axis of the female type connector,

the inner cap includes protrusions on an outer circumferential surface

of the annular portion, and

when the male type connector with the inner cap retained in the male type connector is inserted from an opening of the female type connector with the guide protrusion of the outer cylinder facing the guide groove of the male type connector, and then the female type connector and the male type connector are rotated while being urged axially toward each other, the guide protrusion slides along the guide groove, so that the male type connector is pulled into an inside of the female type connector by a driving force resulting from a screw action by the inclined portion of the guide groove, and at the same time the protrusions of the annular portion slide along the inclined portion of the guide step portion of the female type connector while rotation of the engaging legs of the inner cap relative to the male type connector is blocked by the blocking protrusion of the male type connector, so that a force in the axis direction acts on the inner cap so as to separate the inner cap from the male type connector, resulting in release of the engagement between the inner cap and the male type connector, and the inner cap assumes a state of being retained by the inner cap retaining portion of the outer cylinder.

6. The medical connector system according to claim 5,
wherein the inner cap retaining portion of the female type connector is configured with a horizontal step portion provided continuously at an inside of the inclined portion of the guide step portion, and

when the protrusions of the annular portion of the inner cap contact with the horizontal step portion, the inner cap is prevented from moving in the axis direction toward the opening of the outer cylinder so as to be retained in the female type connector.

7. The medical connector system according to claim 5,
wherein the inner cap retaining portion of the female type connector is configured by setting dimensions of constituting elements so that portions

of the inner wall of the outer cylinder contact with the outer circumferential surface of the annular portion of the inner cap or so that portions of an outer wall of the internal end portion of the inner cylinder contact with an inner circumferential surface of the annular portion of the inner cap, whereby the
5 inner cap is retained by the thus exerted frictional force.

8. A protective cap assembled member used in the medical connector system according to claim 1, comprising:

the protective cap having a substantially cylindrical shape with a
10 closed end; and

the inner cap retained at an inside of the protective cap and including an annular portion with a disinfectant-impregnated member supported in the annular portion,

wherein on an inner wall surface of the protective cap, an inner cap
15 retaining portion for retaining the inner cap is formed,

the inner cap includes a plurality of engaging legs extending from a circumferential edge portion of the annular portion in a direction along an axis of the annular portion, and an engaging convexity is formed at a front end of each of the engaging legs so as to protrude outward, and

20 the inner cap is retained in the inner cap retaining portion so that the front ends of the engaging legs are directed toward an opening of the protective cap.